



Effectiveness of CCTV Surveillance System on Crime Prevention: A Proposed Framework

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ABSTRACT

There are primary challenges regarding the use of CCTV cameras, namely, limited knowledge of CCTV functioning, inadequate knowledge about IT security, and im-proper understanding of several stakeholders towards the maintenance of public safety. These factors have been responsible for intensive debates about the effectiveness of CCTV surveillance strategies amidst the growing discomfort in the communities. With the advent of technology and the possible outcomes that can be gained from such CCTV system implementation in many countries have triggered much attention to be further investigated. Furthermore, this research also examines the impact of, location, institutional framework, social value, policy, centralized monitoring system, technical capacity, authority control, and privacy. This research uses an integrated model in order to examine the impact of those factors of CCTV system effectiveness, and subsequently the impact on the crime prevention. Empirical results derived from the survey bring to notice that the selected variables were significantly correlated and impact towards more effective use of the CCTV system. The research proposes a Smart City Surveillance system effectiveness framework to monitor not only the biggest and the relatively important city, rather the entire country.

1. Introduction

Recent decades have seen the emergence of closed-circuit television (CCTV) surveillance as a mainstream crime prevention measure used around the world. Its rise can be traced to Great Britain, where three-quarters of the home office budget was allocated to CCTV-related projects from 1996 to 1998 (Armitage, 2002). Such policy decisions increased dramatically the number of CCTV systems in Britain, from approximately 100 in 1990 (Piza, 2018a) to over four million less than two decades later (Piza et al., 2019). In the past decade, cities throughout the United States have likewise made substantial investments in CCTV. According to the most recent estimates, 49% of local police departments in the United States report using CCTV, with usage increasing to 87% for agencies serving jurisdictions with populations of 250,000 or more (Reaves, 2015). The increased prevalence of surveillance cameras in public places has led scholars to consider CCTV as a “banal good” that has become part of everyday life, taken-for-granted by the public and subjected to little scrutiny by the media (Goold, Loader, and Thumala, 2013; Piza et al., 2019).

During the early expansion of CCTV, many scholars attributed the marked and sustained growth of this technology to political motivation and public enthusiasm. Painter and Tilley (1999: 2) argued that CCTV’s rise in Britain was due to the “surface plausibility” of the measure and the political benefits officials expected from “being seen to be doing something visible to widespread concerns over crime” Pease (1999: 53) further lamented that policymakers seemingly did not readily consult the scientific evidence when considering the adoption of CCTV, stating: “one is tempted to ask where rigorous standards went into the headlong rush to CCTV deployment.” While research on CCTV was once sparse, the state of the literature can no longer be described as such. The number of CCTV evaluations has increased significantly over time. Furthermore, while public surveillance research in general has been previously described as methodologically weak, with over 55% of studies using less than a comparable experimental control area design (Piza et al., 2019), rigorous designs have been increasingly used in the research of CCTV. We now have several examples of randomized field trials testing the effect of video surveillance cameras as a stand-alone crime deterrent (Piza, 2018b) or as part of proactive place-based patrol strategies (Piza, Caplan, Kennedy, and Gilchrist, 2015). Others have used sophisticated matching techniques in the absence of randomization to help ensure statistical equivalence between treatment and control conditions (Piza, 2018a; Piza et al., 2017). Researchers have also taken advantage of opportunities afforded by naturally occurring social occurrences to reduce problems of endogeneity, when the allocation of CCTV is correlated with unobserved factors that determine crime (Alexandrie, 2019). This increased rigor of the CCTV literature has offered far more insight to help guide policy and practice.

CCTV system surveillance has dominated most industries and publics and has shown significant contribution to most countries in security control, crime prevention and public safety, (Albayan, 2017). Moreover, social media allows more effective communications and enables more effective marketing, (Taylor-Wessing, 2014). Countries nowadays can more effectively protect and secure the public throughout an effective implementation of CCTV system surveillance. Valid evidences from the literature have shown that CCTV systems can be such useful tools to authorities and many industries if operations carried out correctly and effectively, (Lim et al., 2016). Prior studies have considered the factors influence the implementation of CCTV system and also the type of CCTVs, (Qureshi, 2013). This article focuses on those dimensions combined along with the effectiveness of CCTV system in crime prevention, (Taylor-Wessing, 2014). Hence, this research examines the factors impact the effectiveness of CCTV system surveillance. Factors were selected based on critical review of relevant literatures, namely: location, institutional framework, social value, policy, centralized monitoring system, technical capacity, authority control, and privacy.

2. Theoretical Literature and Hypothesis Development

CCTV is a type of situational crime prevention (SCP) strategy that increases levels of formal surveillance within a target area (Welsh and Farrington, 2019). SCP focuses on preventing crime by reducing criminal opportunities and increasing the perceived risk of offending through modification of the physical environment (Clarke, 1995). The situation-al prevention of crime is largely rooted in the rational choice perspective, which considers crime as “purposive behavior designed to meet the offender’s commonplace needs” (Clarke, 1997: 9-10). As per the rational choice perspective, offenders consider a number of “choice structuring properties,” which include the potential rewards and inherent risks involved in the commission of a particular crime. The primary aim of CCTV is considered to be the triggering of a perceptual mechanism that impacts an offender’s choice structur-ing properties in a manner that persuades them to abstain from crime (Welsh and Farrington, 2019).

The research literature indicates that the primary anticipated benefit of CCTV is the prevention of crime, with the majority of evaluations investigating CCTV’s effect by measuring crime level changes from “pre” to “post” camera installation periods. While such a research agenda seems to reflect an emphasis on deterrent effects (Piza et al., 2019), CCTV can prevent crimes through other mechanisms (Welsh and Farrington, 2019). Scholars have concluded that increased offender apprehension, increased natural surveil-lance, publicity, and improved citizen awareness are potential mechanisms of CCTV-generated crime reduction (Lim et al., 2017). Furthermore, CCTV has the potential to assist police after the commission of crimes, specifically by improving the response of personnel to emergencies (Welsh et al, 2017), providing visual evidence for use in criminal investiga-tions (Ashby, 2017), and securing early guilty pleas from offenders (Lim et al., 2017). We must also acknowledge the possibility for CCTV to increase reported crime, as CCTV can detect crimes that would have otherwise gone unreported to police (Lim and Hyungjin, 2018) or to make citizens more vulnerable by providing a false sense of security, causing them to relax their vigilance, or stop taking precautions in public settings (Piza and Eric, 2018).

The present review builds upon the insights provided by the last systematic review, while investigating new questions about the effectiveness of CCTV as a crime prevention modality. There are many factors should be considered when installing the surveillance system and gain enormous benefits, factors such as the proper location, institutional framework, social value, policy, centralized monitoring system, technical capacity, authority control, and privacy to be more assistance for operators and law enforcement agencies. The following sections will consequently explain these factors and the formulated hypotheses.

2.1 Location

One of the most important factors to the effectiveness of CCTV system surveillance is the location of the cameras and where its placed at. It plays an important role in the surveillance process, (Awang, Z. 2012). The cameras must capture as much as possibly can and cover big range of the public areas. In fact, it changes the behaviors of criminals and law offenders. Placement of CCTV cameras must be well distributed and installed to the city, (Ekblom et al, 2013). The geographical location of CCTV cameras is a critical factor which determines the success of the system purposes and therefore provide safer environment. Consequently, the following hypothesis was formulated in order to measure the impact of location on the effectiveness of CCTV system as follows:

Hypothesis 1: It is hypothesized that location impacts the CCTV effectiveness through a causal and statistical relationship.

2.2 Institutional Framework

The role of institutional framework in the CCTV system installation and operation is crucial and considered as a key role to the success of the system. The authorities and the public agencies must standardize their operational framework and features of the CCTV cameras, (Grivna et al, 2012). The standardized installation of cameras must include the policies, budget, privacy and locations of cameras in order to ensure more effective operations and control. Furthermore, the standardized mechanism of handling situations is highly required in the CCTV system surveillance, there should be protocols of these systems to be followed all across the region, those protocols include accessibility and control, (Haggerty, & Samaras, M. 2010). Therefore, institutional framework plays a significant role in the CCTV system effectiveness in the crime prevention. Consequently, the following hypothesis was formulated in order to measure the impact of institutional framework on the CCTV system effectiveness as follows:

Hypothesis 2: It is hypothesized that institutional framework impacts the CCTV effectiveness through a causal and statistical relationship.

2.3 Social Value

Social value refers to the norms and values that the community carries for the CCTV system surveillance and to what extent they value and accept those systems. The degree of the awareness and values the community gives will significantly impact on the system effectiveness as outcomes, (Haggerty et al, 2011). Community plays the key role in the installation and operation process. The acceptance of community in general somewhat a reflection and therefore can change the behaviour of people, (Han et al, 2015). Social value can also impact on the number of offences in communities, as a results of CCTV cameras people can change their attitude in handling situations as long as they value these systems and believe that their actions have been captured and shall be reviewed by authorities. Hence, the following hypothesis was formulated in order to understand the impact of social value on the CCTV system effectiveness as follows:

Hypothesis 3: It is hypothesized that social value impacts the CCTV effectiveness through a causal and statistical relationship.

2.4 Policy

Policy in the CCTV system can either encourage or discourage authorities and public agencies in deciding of the implementation process and as results will impact on the system effectiveness in crime prevention and security control of the region, (Kim et al, 2016). The policy plays an important role in the operation and recording process. Organizations need to follow the declared surveillance policy as an accordance of the authorities. Furthermore, a clear statement or policy from the public authority will result in a systematic operation taking into considerations the publics' privacy and safety, (Makin et al, 2016). Therefore, it's the public authority responsibility to provide clear guidance and funding of those CCTV systems. Consequently, the following hypothesis is formulated in order to explain the role of policy in the CCTV system effectiveness as follows:

Hypothesis 4: It is hypothesized that policy impacts the CCTV effectiveness through a causal and statistical relationship.

2.5 Centralized Monitoring System

The centralized monitoring system refers to effective monitor using integrated centralized systems where all operators are dedicated in the surveillance. The Controlling room of the public should be located at all authorities and public agencies (police stations), (Piza, 2016). Centralized monitoring system should also be supported with authority response and directives in order to take needed actions of certain situations in the city. Therefore, the centralized monitoring system plays a key role in the CCTV system effectiveness in crime prevention as long as it gets the public authority support and prompt actions accordingly, (Simonato, 2014). Consequently, the following hypothesis was formulated in order to explain the role of centralized monitoring system on CCTV system effectiveness in crime prevention as follows:

Hypothesis 5: It is hypothesized that centralized monitoring system impacts the CCTV effectiveness through a causal and statistical relationship.

2.6 Technical Capacity

The availability of technical capacity plays a key role of successful implementation of CCTV systems and can lead to more effectiveness of CCTV cameras in crime preventions. The CCTV system should have the ability to record and capture day to day interaction of the public and digitize it into the systems, (Stutzer et al, 2013). Therefore, those systems must contain the huge number of records and videos captured and make use of it to better controlled and secured environment. The technical capacity of CCTV cameras represented in the speed, memory, clarity of images, and digitizing

content, (Taylor, 2012.) . Hence the authority should play a critical role in advancing those cameras and further enable them for better surveillance. Consequently, the following hypothesis tries to explain the impact of technical capacity on CCTV system effectiveness as follows:

Hypothesis 6: It is hypothesized that technical capacity impacts the CCTV effectiveness through a causal and statistical relationship.

2.7 Authority Control

The CCTV cameras with no doubt play an important role to prevent crimes and provide safer living in many countries. However, the role of authority in the effectiveness of CCTV systems is crucial and to the success and effectiveness of CCTV cameras in many regions. Authorities must be able to control these cameras in terms of specifications, features, locations, and privacy of the public, (Trimek, 2016). As results, this makes it possible to control the overall law offences and prevent crimes happening in the country. Thus, authority must follow a strategy in controlling the CCTV cameras in city/region which can enhance the safety of public, (Chileshe et al, 2016). Authority control can also be seen in the allocation of resources for more effective operations. Consequently, the following hypothesis is formulated to explain the impact of authority control on the CCTV system effectiveness as follows:

Hypothesis 7: It is hypothesized that authority control impacts the CCTV effectiveness through a causal and statistical relationship.

2.8 Privacy

Privacy refers to the degree of security of data and public information that has been captured and revealed to different parties. One of the key determinants of CCTV system effectiveness is the privacy of which people feel that their images and videos will not be misused the otherwise, (Creswell,. 2014). The public expect their data and information are in safe hand and used prospectively in certain situations. Therefore, privacy is an important component to the CCTV systems effectiveness, (Cumming et al, 2015). Hence if the public feels that their images and videos are protected the will accept and encourage further installation of cameras of the area. Consequently, the following hypothesis tries to explain the impact of privacy on CCTV system effectiveness in crime prevention as follows:

Hypothesis 8: It is hypothesized that privacy impacts the CCTV effectiveness through a causal and statistical relationship.

2.9 CCTV Standards Installation

Standard installation of Closed Circuit Television Camera (CCTV) is important for crime prevention and security. The standard design of CCTV could operate effectively at country level to collect images, which are transferred to a monitor-recording device, where they are available to be watched, reviewed and stored. It is a situational measure that enables an area to be kept under surveillance remotely. This makes it possible for the police, and other law and regulatory agencies such as private security, to respond to incidents when alerted, and to have information about what to look for when they arrive. The storing of images facilitates post incident analysis to an investigation. . Therefore, the following hypothesis was developed in order to measure the CCTV standard installation impact on the CCTV system effectiveness as follows:

Hypothesis 9: It is hypothesized that CCTV standard installation impacts the CCTV effectiveness through a causal and statistical relationship.

In order to give an overview of the key empirical research reviewed in this research, table 1 below was established. In this table, the various authors/researchers, the country of their research, and the results obtained are summarized,

Table: 1 Summary of the empirical studies reviewed

Author/Researcher	Year	Country/State	Findings
Ekblom, Armitage, Monchuk, & Castell	2013	UAE	Crime prevention through environmental design (CPTED) in UAE has been facing challenges related to cultural factors and privacy laws

Grivna, Aw, El-Sadig, LOney, Sharif, & Thomsen	2011	UAE	UAE has established public surveillance legal framework; and making it easier for the establishment of the major causes of injuries in the environment among individuals, equipments, and environmental risk factors
Jeremy Hywel Thomas	2016	UAE	They believe the effective maintenance of services directly contributes to political stability which assures the continuance of their current system of governance where political power lies solely with the rulers and their close advisors
Ahmed AlKaabi	2014	UK	the research conducted an intervention research that proposed a UAE-focused strategy designed to promote information security education for the younger generation to mitigate the risk of sensitive information sharing
Haggerty & Samaras	2010	-	Surveillance is mainly used to oppress and foster dictatorship in the society; as too much surveillance gives the government warrantless monitoring of people.
Agnes Bauer	2014	UK	The empirical part analyses the top ten security system integrators on the local markets based on their estimated market shares. This method allows us to see whether there are some companies on the market that can become potential key account partners for Bosch Security Systems.
Haggerty, Wilson, & Smith	2011	Germany	Implementing surveillance control system was found to have contributed largely towards the reduction of crime
Sedat KULA	2015	Turkey	The extant literature on fear of crime, effectiveness of police, and CCTV with using routine activity theory as a theoretical framework. Then data
Ibrahim Mohamed Zainal	2017	UK	The thesis ends with an outline of the different vulnerabilities in each UAE Emirate but also with an emphasis on the importance of Muslim faith as the backbone of the total national community and the stepping-stone to a community based DRR.

Al-Moalla, Sheikh,Majid,Abdul la	2017	UK	This thesis presents the first hazard history of UAE. A vulnerability viewpoint is used to evaluate the hazard history and findings are presented in the paradigm of natural hazards research. An evaluation of UAE's institutionalization of Disaster Risk Reduction (DRR) strategies in the context of its international obligations, e.g. the Hyogo.
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3. Conceptual Framework

This Conceptual framework can be used as the overarching theoretical structure. As revealed in this review, public surveillance is a critical security component that contributes largely towards controlling of crime. However, researchers agree that the type of public surveillance system based on quality standards largely determine how effective such systems are. Moreover, researchers agree that not only the quality of the surveillance systems is an important consideration, but also the design of the system, how it is integrated in the environment, and the entire design, which altogether contributes significantly towards the success of the system and its ability to prevent crime in an area. The framework explains clearly how the postulated hypotheses relate to each other and provides the key input of this research. Based on the discussion above, a research framework has been developed as shown in Figure 1.

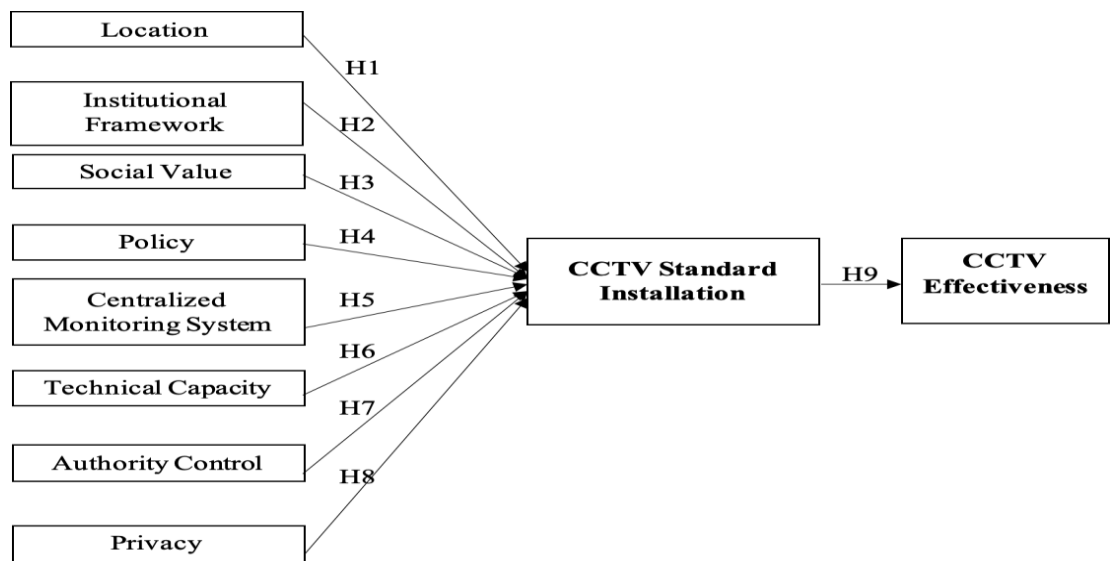


Figure: 1 Conceptual Framework of CCTV system Effectiveness

4. Results and Discussion

This is an important component of this model. It greatly influences the behavior of the criminals and the placement of the CCTV Cameras. There is need to install CCTV cameras inside the buildings and on the streets to ensure effective surveillance of the streets. The local council must carry out a crime assessment of the area where problems have been identified. The analysis should be conducted in consultation with local police, and as appropriate, representatives of the local community. Consideration should be given to the nature, type and volume of criminal activities occurring within the area under consideration. The legitimate ways in which various members of the community use the area, including differences across weekdays, time of day, and seasons the situational and environmental factors which appear to contribute to the criminal activities, the possibility of displacement (that is, merely shifting the crimes), both in terms of crime type and geographic location. Effective location of cameras will be critical to the success of the program. Camera location should also be guided by the specific objectives of the program and should be done in consultation with the local police. While undertaking the analysis, consideration should also be given to a range of crime prevention initiatives which

could address the identified problems. The possibility should always be borne in mind that CCTV may not be the best response to a place's particular problems, or that the costs of the scheme might outweigh the benefits. In line with these lines of reasoning, the present research also supports (Ekblom et al, 2013). Therefore, the following hypothesis was developed in order to measure the location impact on the CCTV system effectiveness.

An effective organizational structure clearly identifying the roles of key players can enhance stakeholder involvement. E.g. The Supreme Council for National Security should be the owners of the system as they play a key role in coordination of all local authorities' program. Local councils are responsible for the following key functions such as developing and implementing an effective complaint handling mechanism in consultation with other key stakeholders and the CCTV committee, a code of practice, protocols and standard operating procedures with other agencies in relation to their roles in the CCTV program, law and order and is the lead agency in security. By involving the police who should be given a major role in, hosting the control rooms and provision of personnel to effect arrest of criminals, providing information for and advice on the crime assessment and finally, training local police in their responsibilities in relation to the CCTV program as set out in the code of practice. However, Grivna et al, (2012) and Haggerty & Samaras, (2010) also support the same results. Therefore, the following hypothesis was developed in order to measure the institutional framework impact on the CCTV system effectiveness.

In most cities crime rates are largely determined by social and environmental factors such as poverty, levels, single family households, racial makeup, income, education level, number of police officers and age group of the population. In addition, lack of decentralization within the national government, lack of resources among police officers, weak management, outdated operation methods, equity and public participation are other factors that influence crime rates. ethnic heterogeneity, residential mobility, and low socioeconomic status on an area's ability to prevent crime are likely to lead to high levels of social disorganization, which in turn increases the likelihood of crime and criminal violence

Social disorganization refers to the inability of a community structure to mobilize the common values of its residents to maintain effective social controls, neighborhoods characterized by high levels of poverty or economic deprivation, residential mobility, ethnic heterogeneity, family disruption, poor housing conditions, and low levels of education are most likely to be disorganized and have higher levels of crime and violence. Disorganization, a lack of solidarity and cohesion, and the absence of a shared sense of community and mutual commitment between residents allow crime to flourish because the community's capacity for informal social control is inhibited.

Certain groups carry sets of norms and values that make them more likely to engage in crime. High rates of violence result from a culture where criminality in general and violence in particular, are more acceptable forms of behavior. Social institutions themselves contribute to the development and persistence of a subculture conducive to criminality and violence. For example, the disintegration of particular institutions (i.e., churches, families, and schools) denies certain the opportunity to learn conventional norms and values. The result of such processes is that certain groups are more likely to use violence in their day-to-day encounters, and violence is seen as an acceptable means to solving disputes. Han et al, (2015) and (Haggerty et al, (2011), supported this conclusion substantially. Therefore, the following hypothesis was developed in order to measure the social value impact on the CCTV system effectiveness.

The existing policy can either encourage or discourage integrated stakeholder involvement in decision making and implementation of CCTV Cameras. Policy Guidelines should be developed by the Government to provide a policy framework and a set of under-lying principles to assist agencies considering CCTV as a possible response to local community safety concerns. The Guidelines should principally aim at local councils or Police as the most appropriate owners of CCTV schemes in public places. Local councils are democratically organised, are close and accountable to local communities, and generally have the capacity to co-ordinate local activities in crime prevention and the promotion of community safety. It must be recognised that ownership brings with it accountability, responsibility for securing funding, responsibility to consult with and inform the community as interested parties, and responsibility for design, management, running costs, evaluation and audit activities. In line with these lines of reasoning, the present research also supports (Makin et al, 2016). Therefore, the following hypothesis was developed in order to measure the policy impact on the CCTV system effectiveness.

This involves effective monitoring using integrated centralized systems where staffs are dedicated in monitoring/surveillance. Control rooms should be placed at all police stations and police posts within the central business district to ensure that all their areas are covered and will increase incident response. This integrated system should be supported by police response teams who have vehicles fitted with the system and stationed at strategic locations in the cities. The constraints in terms of network connection for effective communication in real-time requires a reliable network provider. However, Simonato, (2014) also support the same results. Therefore, the following hypothesis was developed in order to measure the centralized monitoring system impact on the CCTV system effectiveness.

Availability of financial resources and technical capacity is key to the successful implementation projects. The Supreme Council for National Security should play a critical role in financing or securing resources through the government and the donors. This is a critical component for the successful implementation of any project. Stutzer et al, (2013), and Taylor, (2012), supported this conclusion substantially. Therefore, the following hypothesis was developed in order to measure the technical capacity impact on the CCTV system effectiveness.

Closed Circuit Television Camera (CCTV) is important tool for crime prevention and security. Cameras collect images, which are transferred to a monitor- recording device, where they are available to be watched, reviewed and stored. It is a situational measure that enables an area to be kept under surveillance remotely. This makes it possible for the police, and other law and regulatory agencies such as private security, to respond to incidents when alerted, and to have information about what to look for when they arrive. The storing of images facilitates post- incident analysis to an investigation. CCTV can be effective if the authority control is found to reduce or prevent crime if it is part of a broader crime prevention and community safety strategy and control. CCTV can bring benefits to the community through a reduction in crime which can lead to enhanced perceptions of safety in a particular area. On the other hand, CCTV may involve a degree of cost to the community, for example in terms of the allocation of resources or in implications on personal privacy. Chileshe et al, (2016), supported this conclusion substantially. Therefore, the following hypothesis was developed in order to measure the authority control impact on the CCTV system effectiveness.

Community participation can be measured in many ways but for purposes of this research we will emphasize on involvement in implementation and decision making. Community consultation will help ensure that schemes are designed to meet local needs. It will also facilitate strong and continuing public support, if and when, a scheme is implemented. Publicity and high quality information provide an opportunity for the community to voice any concerns. The objectives of the program, it is important that the community be provided with a realistic appraisal of what the program might achieve, i.e. what types of offences/ behaviors are/are not likely to be deterred. CCTV should not be promoted as a cure for all crime problem. In line with these lines of reasoning, the present research also supports (Cumming et al, 2015). Therefore, the following hypothesis was developed in order to measure the privacy impact on the CCTV system effectiveness.

Standard installation of Closed-Circuit Television Camera (CCTV) is important for crime prevention and security. The standard design of CCTV could operate effectively at country level to collect images, which are transferred to a monitor- recording device, where they are available to be watched, reviewed and stored. It is a situational measure that enables an area to be kept under surveillance remotely. This makes it possible for the police, and other law and regulatory agencies such as private security, to respond to incidents when alerted, and to have information about what to look for when they arrive. The storing of images facilitates post- incident analysis to an investigation. However, (Trimek, 2016) also support the same results. Therefore, the following hypothesis was developed in order to measure the CCTV standard installation impact on the CCTV system effectiveness.

Authority control has shown a significant impact on CCTV system effectiveness in crime prevention among UAE public agencies. Moreover, policy has second significant positive relationship on the CCTV system effectiveness. Which means the clearer policy to these systems the higher effectiveness of CCTV systems in UAE context. Policy is an important element to be designed and integrated into CCTV system installation tools. Another significant fact is that privacy seemed to play a vital role towards more effective installation in crime prevention context. Based on the findings institutional framework can with no doubt effect the CCTV system effectiveness in crime prevention and should be considered into integration into the CCTV system installation, operations, and monitoring. From the public agencies' point of view CCTV cameras have to be well maintained and controlled. Public agencies concern is with the private information and data on these systems to be misused or tampered with others. Nevertheless, the research has supported the integrated factors namely, location, institutional framework, social value, policy, centralized monitoring system, technical capacity, authority control, and privacy. The significant findings of this research show that all relationships were supported.

5. Conclusion

Authority control has shown a significant impact on CCTV system effectiveness in crime prevention. Moreover, policy has a second significant positive relationship on the CCTV system effectiveness. Which means the clearer policy to these systems the higher effectiveness of CCTV systems. Policy is an important element to be designed and integrated into CCTV system installation tools. Another significant fact is that privacy seemed to play a vital role towards more effective installation in crime prevention context. Based on the findings institutional framework can with no doubt effect the CCTV system effectiveness in crime prevention and should be considered into integration into the CCTV system installation, operations, and monitoring. From the public agencies' point of view CCTV cameras have to be well maintained and controlled. Public agencies concern is with the private information and data on these systems to be misused or tampered with others. Nevertheless, the research has supported the integrated factors namely, location, institutional framework, social value, policy, centralized monitoring system, technical capacity, authority control, and privacy. The significant findings of this research show that all relationships were supported.

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